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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/781,898	02/20/2004	Srinivas Bollapragada	52493.000362	4222
21967 7590 10/15/2008 HUNTON & WILLIAMS LLP INTELLECTUAL PROPERTY DEPARTMENT 1900 K STREET, N.W. SUITE 1200 WASHINGTON, DC 20006-1109				
EXAMINER WONG, ERIC TAI WAI				
ART UNIT		PAPER NUMBER		
3693				
MAIL DATE		DELIVERY MODE		
10/15/2008		PAPER		

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

### Office Action Summary

**Application No.**

10/781,898

**Applicant(s)**

BOLLAPRAGADA ET AL.

**Examiner**

ERIC T. WONG

**Art Unit**

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 05 September 2008.  
2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.  
3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-13 and 15-21 is/are pending in the application.  
4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.  
5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.  
6) ☒ Claim(s) 1-13 and 15-21 is/are rejected.  
7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.  
8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.  
10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).  
11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
a) ☐ All b) ☐ Some \* c) ☐ None of:  
1. ☐ Certified copies of the priority documents have been received.  
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.  
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)  
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)  
3) ☐ Information Disclosure Statement(s) (PTO/S508)  
Paper No(s)/Mail Date \_\_\_\_\_  
4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date \_\_\_\_\_  
5) ☐ Notice of Informal Patent Application  
6) ☐ Other: \_\_\_\_\_

## DETAILED ACTION

### *Claim Rejections - 35 USC § 102*

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

**Examiner's note:** Examiner has pointed out particular references contained in the prior art of record in the body of this action for the convenience of the Applicant. Although the specified citations are representative of the teachings in the art and are applied to the specific limitations within the individual claim, other passages and figures may apply. Applicant, in preparing the response, should consider fully the **entire** reference as potentially teaching all or part of the claimed invention, as well as the content of the passage as taught by the prior art or disclosed by the Examiner.

2. Claims 1, 3, 5, 8, 11, 15 rejected under 35 U.S.C. 102(b) as being anticipated by Avellaneda ("Quantitative Analysis in Financial Markets").
3. Regarding claim 1, Avellaneda teaches generating an initial population of solutions of portfolio allocations in a computing device, the generating the initial population of solutions of portfolio allocations including systematically generating the initial population of solutions to substantially cover the space defined by the competing objectives and the plurality of constraints; and generating an efficient frontier in a space in the computing device based on the initial population, the efficient frontier for use in investment decisions; and wherein the generating an efficient frontier in the space based on the initial population includes: performing a first multi-objective process, based on the initial population and the competing objectives, to generate a first interim efficient frontier; performing a second multi-objective process, based on the initial population and competing objectives, to generate a second interim efficient frontier;

and augmenting the first interim efficient frontier with the second interim efficient frontier to create an augmented efficient frontier (see Exhibit 7, pp. 50-55).

4. Regarding claim 3, Avellaneda teaches wherein the competing objectives include risk and return and the space is a risk/return objectives space (see page 50, paragraphs 3 and 4).
5. Regarding claim 5, Avellaneda teaches wherein the initial population of solutions includes multiple feasible points (see page 51, paragraph 2).
6. Regarding claim 8, Avellaneda teaches wherein the generating the initial population of solutions of portfolio allocations includes generating portfolios with different combinations of risk and return values (see page 50, paragraphs 3 and 4).
7. Regarding claim 11, Avellaneda teaches wherein the generating the initial population of solutions of portfolio allocations includes generating portfolios with different combinations of competing values (see page 50, paragraphs 3 and 4).
8. Regarding claim 15, Avellaneda teaches wherein a dominance filter process is applied on the augmented efficient frontier to create a global efficient frontier (see Exhibit 7, pp. 50-51).

***Claim Rejections - 35 USC § 103***

9. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

10. Claims 2, 6-7, 9-10, 12-13, 16-21 rejected under 35 U.S.C. 103(a) as being unpatentable over Avellaneda in view of Zosin (US PG-Pub 2004/0181479).

11. Regarding claim 2, Avellaneda does not explicitly teach wherein the generating the initial population of solutions uses a combination of linear programming and sequential linear programming algorithms. Zosin teaches generating an initial population of solutions using a combination of linear programming and sequential linear programming algorithms (see paragraph 124). It would have been obvious to one skilled in the art at the time of invention to modify the method of augmenting interim efficient frontiers of Avellaneda with wherein the generating the initial population of solutions uses a combination of linear programming and sequential linear programming algorithms because linear programming is a common optimization technique.
12. Regarding claim 6, Avellaneda does not explicitly teach wherein the multiple initial feasible points are generated by solving linear programs. Zosin teaches generating multiple initial feasible points by solving linear programs (see paragraph 124). It would have been obvious to one skilled in the art at the time of invention to modify the method of augmenting interim efficient frontiers of Avellaneda with wherein the multiple initial feasible points are generated by solving linear programs because linear programming is a common optimization technique.
13. Regarding claim 7, Avellaneda does not explicitly teach wherein the linear programs utilize randomized parameters. Zosin teaches linear programs utilizing randomized parameters (see paragraph 77). It would have been obvious to one skilled in the art at the time of invention to modify the method of augmenting interim efficient frontiers of Avellaneda further with wherein the linear programs utilize randomized parameters in effort to achieve an accurate model.
14. Regarding claim 9, Avellaneda does not explicitly teach wherein the generating portfolios with different combinations of risk and returns values are performed by adding additional risk and return constraints to a linear program corresponding to the risk and return objectives. Zosin

teaches wherein the generating portfolios with different combinations of risk and returns values are performed by adding additional risk and return constraints to a linear program corresponding to the risk and return objectives (see paragraph 39). It would have been obvious to one skilled in the art at the time of invention to modify the method of augmenting interim efficient frontiers of Avellaneda with wherein the generating portfolios with different combinations of risk and returns values are performed by adding additional risk and return constraints to a linear program corresponding to the risk and return objectives. One skilled in the art would have been motivated to make the modification to incorporate other factors into the model (see paragraphs 11 and 39)

15. Regarding claim 10, Avellaneda does not explicitly teach wherein portfolios with substantially all feasible combinations of risk and return values are generated by modifying parameters of the added risk and return constraints. Zosin teaches wherein portfolios with substantially all feasible combinations of risk and return values are generated by modifying parameters of the added risk and return constraints (see paragraph 39). It would have been obvious to one skilled in the art at the time of invention to modify the method of augmenting interim efficient frontiers of Avellaneda further with wherein portfolios with substantially all feasible combinations of risk and return values are generated by modifying parameters of the added risk and return constraints in order to explore the tradeoffs between between risk and return (see paragraph 39).

16. Regarding claim 12, Avellaneda does not explicitly teach wherein the generating portfolios with different combinations of competing values are performed by adding additional competing value constraints to a linear program corresponding to the objectives of the competing values. Zosin teaches wherein the generating portfolios with different combinations of competing values are performed by adding additional competing value constraints to a linear

program corresponding to the objectives of the competing values (see paragraph 39). It would have been obvious to one skilled in the art at the time of invention to modify the method of augmenting interim efficient frontiers of Avellaneda further with wherein the generating portfolios with different combinations of competing values are performed by adding additional competing value constraints to a linear program corresponding to the objectives of the competing values. One skilled in the art would have been motivated to make the modification to incorporate other factors into the model (see paragraphs 11 and 39).

17. Regarding claim 13, Avellaneda does not explicitly teach wherein portfolios with substantially all feasible combinations of the competing values are generated by modifying parameters of the added competing value constraints. Zosin teaches wherein portfolios with substantially all feasible combinations of the competing values are generated by modifying parameters of the added competing value constraints (see paragraph 39). It would have been obvious to one skilled in the art at the time of invention to modify the method of augmenting interim efficient frontiers of Avellaneda further with wherein portfolios with substantially all feasible combinations of the competing values are generated by modifying parameters of the added competing value constraints in order to explore the tradeoffs between any combination of the factors (see paragraph 39).

18. Regarding claim 16, Avellaneda does not explicitly teach wherein nonlinear risk and return constraints are approximated with linear constraints generated by a sequential linear programming. Zosin teaches wherein nonlinear risk and return constraints are approximated with linear constraints generated by a sequential linear programming (see paragraph 124). It would have been obvious to one skilled in the art at the time of invention to modify the method of augmenting interim efficient frontiers of Avellaneda further with wherein nonlinear risk and return constraints are approximated with linear constraints generated by a sequential linear

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programming. One skilled in the art would have been motivated to make the modification to allow for a model that more accurately represents the real world, since sequential linear programming allows for the optimization of a problem with non-linear characteristics as a series of linear approximations.

19. Regarding claims 17-21, the claims recite limitations found in the claims discussed above and are therefore rejected for similar reasons.



***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to ERIC T. WONG whose telephone number is 571-270-3405. The examiner can normally be reached on Monday-Friday 9:00AM-5:00PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, James A. Kramer can be reached on 571-272-6783. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/James A. Kramer/  
Supervisory Patent Examiner, Art Unit 3693

ERIC T. WONG  
Examiner  
Art Unit 3693

October 7, 2008